**APPENDICES**

**Appendix 1: Carotenoid absorption data of the fishes at different sampling**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|   | W-0 | W-1 | W-2 | W-3 | W-4 | W-5 |
| Treatment | Carotenoid(mg/100kg) | Carotenoid(mg/100kg) | Carotenoid(mg/100kg) | Carotenoid(mg/100kg) | Carotenoid(mg/100kg) | Carotenoid(mg/100kg) |
| T0R1 | 0.1121 | 0.1132 | 0.1184 | 0.1185 | 0.1187 | 0.1187 |
| T0R2 | 0.1263 | 0.1363 | 0.1368 | 0.1379 | 0.1384 | 0.1385 |
| T0R3 | 0.0942 | 0.1158 | 0.1205 | 0.1207 | 0.1210 | 0.1216 |
| T1R1 | 0.1158 | 0.1211 | 0.1305 | 0.1363 | 0.1368 | 0.1432 |
| T1R2 | 0.0763 | 0.1316 | 0.1368 | 0.1421 | 0.1474 | 0.1532 |
| T1R3 | 0.1184 | 0.1200 | 0.1216 | 0.1311 | 0.1316 | 0.1400 |
| T2R1 | 0.1474 | 0.1568 | 0.1579 | 0.1679 | 0.1711 | 0.1763 |
| T2R2 | 0.1158 | 0.1842 | 0.1937 | 0.1995 | 0.2095 | 0.2153 |
| T2R3 | 0.1058 | 0.1263 | 0.1579 | 0.1684 | 0.1721 | 0.1784 |
| T3R1 | 0.1053 | 0.1316 | 0.1421 | 0.1474 | 0.1537 | 0.1684 |
| T3R2 | 0.1000 | 0.1263 | 0.1379 | 0.1505 | 0.1574 | 0.1637 |
| T3R3 | 0.1421 | 0.1526 | 0.1658 | 0.1716 | 0.1774 | 0.1837 |

\*W= Week, TR= Treatment × Replication

**Appendix 2: Weight data of the fishes at different sampling**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|   | W-0 | W-1 | W-2 | W-3 | W-4 | W-5 |
| Treatment | weight(gm) | weight(gm) | weight(gm) | weight(gm) | weight(gm) | weight(gm) |
| T0R1 | 5.060 | 5.270 | 5.820 | 5.950 | 6.000 | 6.200 |
| T0R2 | 2.970 | 4.070 | 4.890 | 5.810 | 5.950 | 6.100 |
| T0R3 | 5.210 | 5.330 | 5.789 | 5.880 | 5.900 | 6.000 |
| T1R1 | 4.380 | 4.386 | 4.490 | 4.520 | 4.730 | 4.760 |
| T1R2 | 4.270 | 4.276 | 4.560 | 4.610 | 4.650 | 4.770 |
| T1R3 | 3.990 | 4.250 | 4.420 | 4.510 | 4.720 | 4.784 |
| T2R1 | 3.430 | 3.489 | 3.990 | 4.457 | 4.574 | 4.668 |
| T2R2 | 5.500 | 5.520 | 5.560 | 5.596 | 5.606 | 5.712 |
| T2R3 | 4.000 | 4.460 | 4.551 | 4.757 | 4.880 | 5.011 |
| T3R1 | 3.150 | 3.372 | 3.745 | 3.770 | 3.896 | 3.957 |
| T3R2 | 3.000 | 3.242 | 3.634 | 3.686 | 3.698 | 3.711 |
| T3R3 | 3.790 | 3.886 | 4.231 | 4.295 | 4.341 | 4.577 |

\*W= Week, TR= Treatment × Replication

**Appendix 3: Length data of the fishes at different sampling**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|   | W-0 | W-1 | W-2 | W-3 | W-4 | W-5 |
| Treatment | Length(cm) | Length (cm) | Length (cm) | Length(cm) | Length(cm) | Length(cm) |
| T0R1 | 3.8 | 3.8 | 3.8 | 4 | 4 | 4.4 |
| T0R2 | 4 | 4 | 4 | 4.3 | 4.3 | 4.5 |
| T0R3 | 3.9 | 3.9 | 3.9 | 4.2 | 4.3 | 4.6 |
| T1R1 | 3.9 | 3.9 | 3.9 | 4.1 | 4.2 | 4.3 |
| T1R2 | 3.9 | 3.9 | 3.9 | 4.1 | 4.2 | 4.4 |
| T1R3 | 3.6 | 3.6 | 3.8 | 4 | 4 | 4.4 |
| T2R1 | 3.8 | 3.8 | 4 | 4.2 | 4.3 | 4.6 |
| T2R2 | 3.8 | 3.9 | 3.9 | 4.3 | 4.3 | 4.6 |
| T2R3 | 3.7 | 3.7 | 3.9 | 4.1 | 4.1 | 4.5 |
| T3R1 | 3.8 | 3.8 | 3.9 | 4.2 | 4.3 | 4.5 |
| T3R2 | 3.7 | 3.7 | 3.8 | 4.2 | 4.2 | 4.5 |
| T3R3 | 3.8 | 3.8 | 4 | 4.3 | 4.3 | 4.7 |

\*W= Week, TR= Treatment × Replication

**Appendix 4: Carotenoid gain data of the fishes at different weeks**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | W-1 | W-2 | W-3 | W-4 | W-5 |
| Treatment | Carotenoid(mg/100kg) | Carotenoid(mg/100kg) | Carotenoid(mg/100kg) | Carotenoid(mg/100kg) | Carotenoid(mg/100kg) |
| T0R1 | 0.001053 | 0.005263 | 0.000053 | 0.000211 | 0.000053 |
| T0R2 | 0.010000 | 0.000526 | 0.001053 | 0.000474 | 0.000105 |
| T0R3 | 0.021579 | 0.004737 | 0.000158 | 0.000316 | 0.000579 |
| T1R1 | 0.005263 | 0.009474 | 0.005789 | 0.000526 | 0.006316 |
| T1R2 | 0.055263 | 0.005263 | 0.005263 | 0.005263 | 0.005789 |
| T1R3 | 0.001579 | 0.001579 | 0.009474 | 0.000526 | 0.008421 |
| T2R1 | 0.009474 | 0.001053 | 0.010000 | 0.003158 | 0.005263 |
| T2R2 | 0.068421 | 0.009474 | 0.005789 | 0.010000 | 0.005789 |
| T2R3 | 0.020526 | 0.031579 | 0.010526 | 0.003684 | 0.006263 |
| T3R1 | 0.026316 | 0.010526 | 0.005263 | 0.006316 | 0.014737 |
| T3R2 | 0.026316 | 0.011579 | 0.012632 | 0.006842 | 0.006316 |
| T3R3 | 0.010526 | 0.013158 | 0.005789 | 0.005789 | 0.006316 |

\*W= Week, TR= Treatment × Replication

**Appendix 5: Weight gain data of the fishes at different weeks**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | W-1 | W-2 | W-3 | W-4 | W-5 |
| Treatment | Weight gain  | Weight gain | Weight gain | Weight gain | Weight gain |
| T0R1 | 0.21 | 0.55 | 0.130 | 0.05 | 0.2 |
| T0R2 | 1.1 | 0.82 | 0.920 | 0.14 | 0.15 |
| T0R3 | 0.12 | 0.459 | 0.091 | 0.02 | 0.1 |
| T1R1 | 0.006 | 0.104 | 0.030 | 0.21 | 0.03 |
| T1R2 | 0.006 | 0.284 | 0.050 | 0.04 | 0.12 |
| T1R3 | 0.26 | 0.17 | 0.090 | 0.21 | 0.064 |
| T2R1 | 0.059 | 0.501 | 0.467 | 0.117 | 0.094 |
| T2R2 | 0.02 | 0.04 | 0.036 | 0.01 | 0.106 |
| T2R3 | 0.46 | 0.091 | 0.206 | 0.123 | 0.131 |
| T3R1 | 0.222 | 0.373 | 0.025 | 0.126 | 0.061 |
| T3R2 | 0.242 | 0.392 | 0.052 | 0.012 | 0.013 |
| T3R3 | 0.096 | 0.345 | 0.064 | 0.046 | 0.236 |

\*W= Week, TR= Treatment × Replication

**Appendix 6: Length gain data of the fishes at different weeks**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | W-1 | W-2 | W-3 | W-4 | W-5 |
| Treatment | Length gain(cm) | Length gain(cm) | Length gain(cm) | Length gain(cm) | Length gain(cm) |
| T0R1 | 0 | 0 | 0.2 | 0 | 0.4 |
| T0R2 | 0 | 0 | 0.3 | 0 | 0.2 |
| T0R3 | 0 | 0 | 0.3 | 0.1 | 0.3 |
| T1R1 | 0 | 0 | 0.2 | 0.1 | 0.1 |
| T1R2 | 0 | 0 | 0.2 | 0.1 | 0.2 |
| T1R3 | 0 | 0.2 | 0.2 | 0 | 0.4 |
| T2R1 | 0 | 0.2 | 0.2 | 0.1 | 0.3 |
| T2R2 | 0.1 | 0 | 0.4 | 0 | 0.3 |
| T2R3 | 0 | 0.2 | 0.2 | 0 | 0.4 |
| T3R1 | 0 | 0.1 | 0.3 | 0.1 | 0.2 |
| T3R2 | 0 | 0.1 | 0.4 | 0 | 0.3 |
| T3R3 | 0 | 0.2 | 0.3 | 0 | 0.4 |

\*W= Week, TR= Treatment × Replication

**Appendix 7: Average carotenoid gain data of fishes per treatment per week**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Treatmment |  W-0 | W-1 | W-2 | W-3 | W-4 | W-5 |
| T0 | 0.1109 | 0.1218 | 0.1253 | 0.1257 | 0.1260 | 0.1263 |
| T1 | 0.1035 | 0.1242 | 0.1296 | 0.1365 | 0.1386 | 0.1454 |
| T2 | 0.1230 | 0.1558 | 0.1698 | 0.1786 | 0.1842 | 0.1900 |
| T3 | 0.1158 | 0.1368 | 0.1486 | 0.1565 | 0.1628 | 0.1719 |

\*W= Week, TR= Treatment × Replication

**Appendix 8: Average weight data of fishes per treatment per week**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Treatmment |  W-0 |  W-1 |  W-2 | W-3 | W-4 | W-5 |
| T0 | 4.413 | 4.89 | 5.5 | 5.88 | 5.95 | 6.1 |
| T1 | 4.213 | 4.304 | 4.49 | 4.547 | 4.7 | 4.771 |
| T2 | 4.31 | 4.49 | 4.7 | 4.937 | 5.02 | 5.13 |
| T3 | 3.313 | 3.5 | 3.87 | 3.917 | 3.978 | 4.082 |

\*W= Week, TR= Treatment × Replication

**Appendix 9: Average length (cm) data of fishes per treatment per week**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Treatment |  W-0 |  W-1 |  W-2 |  W-3 |  W-4 |  W-5 |
| T0 | 3.9 | 3.9 | 3.9 | 4.166 | 4.2 | 4.5 |
| T1 | 3.8 | 3.8 | 3.866 | 4.066 | 4.133 | 4.366 |
| T2 | 3.766 | 3.8 | 3.933 | 4.2 | 4.2333 | 4.566 |
| T3 | 3.766 | 3.766 | 3.9 | 4.23 | 4.266 | 4.566 |

\*W= Week, TR= Treatment × Replication

**Appendix 10: Data of SPSS Analysis**

|  |  |  |  |
| --- | --- | --- | --- |
| **Treatment** | **Weight(gm)** | **Length(cm)** | **Carotenoid(mg/100kg)** |
| T0 | 5.455±0.821c (5.046-5.864) | 4.094±0.250b(3.969-4.219) | 0.122± 0.0115b(0.116-0.128) |
| T1 | 4.504±0.219a(4.394- 4.613) | 4.005± 0.233b(3.889- 4.121) | 0.129± 0.0169b(0.121- 0.138) |
| T2 | 4.764±0.727a(4.402- 5.126) | 4.083-0.297b(3.935-4.231) | 0.166±0.029b(0.152- 0.181) |
| T3 | 3.776±0.418b(3.568- 3.984) | 4.083± 0.311b(3.928- 4.238) | 0.148±0.022a(0.137- 0.160) |
| Level of significance | 0.001 | 0.0232 | 0.021 |